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## Recouping the costs of apprenticeship training: employer case study evidence from England

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### Abstract

From a public policy perspective where the aim is to increase the number of employers providing Apprenticeships in a system which provides policy makers with few demand side levers the most persuasive argument policy makers can craft is one based on demonstrating that investing in Apprenticeships will yield a positive return to the employer. This paper outlines a method for calculating the return to the employer and, based on a series of in-depth employer case studies conducted in England during 2007/8, provides estimates of how quickly employers in different sectors of the economy can recoup their investments in Apprenticeships.

*Keywords: Apprenticeships, Training; Employers*

### 1. Introduction

Public policy in England over recent years has become increasingly concerned with how to make the vocational training system more responsive to employer demand. Central to this goal has been to give employers - or their representatives - a central role in the design and structure of vocational qualifications principally through Sector Skills Councils (SSCs). Whilst this plausibly makes vocational training more attractive to employers, it remains the case that some employers at least are concerned about their capacity to appropriate the returns from any training they might provide. In a relatively flexible labour market such as that found in England the relative ease with which employees can move between employers can, other things being equal, act as a disincentive for firms to train. Hence there is almost a preoccupation with demonstrating to employers that training pays (Hogarth & Wilson, 2002).

With respect to initial vocational education and training there is a keen public policy interest in demonstrating the business benefits which derive from engagement

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in Apprenticeship training. More often than not this has been expressed with reference to a range of qualitative benefits such as the better fit between the skills of the apprentice and the needs of the company compared with recruiting skilled workers from the external labour market. The aim of this paper is to provide a quantitative assessment of the benefits which accrue to the employer from engaging in Apprenticeship training through demonstrating the period over which the costs borne by the employer are recouped. The estimated payback period has been calculated using data collected from a series of in-depth employer case studies conducted in England in 2007/08. As will be seen some employers, especially those in sectors characterised as having relatively high levels of labour turnover, are able recoup their costs more or less over the period of the Apprenticeship, whereas in other cases the payback period can be around one and a half to three years.

The remainder of this paper proceeds as follows. Section 2 outlines the organisation of the Apprenticeship system in England. Section 3 overviews the relevant literature regarding the costs and benefits of education and training, with particular focus on the evidence relating to Apprenticeships in the UK and internationally. Section 4 outlines the methodology used and offers details of the data on which the estimates are based. In Section 5, the calculated net costs of apprenticeships and the payback periods are presented and discussed. Finally, conclusions are given in Section 6.

## **2. The Apprenticeship System in England**

Whilst Apprenticeship in England has a long history dating back to the master guilds of mediaeval times, the modern day Apprenticeship dates back to the mid 1990s when the Modern Apprenticeship (MA) initiative was launched. This not only incorporated many of the sectors where Apprenticeship had been the traditional means of entry into skilled employment, but many others with no tradition at all of this type of training (such as retailing, financial services, etc.). From the outset there seems to have been a degree of restiveness with the operation the MA programme given the number of inquiries and reforms which were initiated after its introduction. While evidence collected at the time when the MA programme was introduced suggested it had increased the number of apprentices (Hasluck et al., 1995), commentators continued to chip away at the idea that a Modern Apprenticeship often taking around one to two years to complete in, for instance, retailing was in any way comparable to a traditional Apprenticeship in, say, engineering which took around four years to complete and which led to the award of a well-established qualification (Fuller & Unwin, 2003). Consequently there have been a number of quasi-Governmental inquiries and recommendations to improve the Apprenticeship system, including the Modern Apprenticeship Advisory Committee, the Modern Apprenticeship Task Force (ATF, 2005), the House of Lord's Select Committee on Economic Affairs (HoL, 2007), and the Government White Paper, «World Class Apprenticeships: Unlocking Talent, Building Skills for All» (DIUS, 2008).

Currently, the Apprenticeship system in England is structured as follows:

- *(Foundation)<sup>1</sup> Apprenticeships* where apprentices work towards work-based learning qualifications at a level consistent with National Vocational Qualification (NVQ) Level 2;
- *Advanced Apprenticeships* where apprentices work towards work-based learning qualifications at a level consistent with (NVQ) Level 3;
- *Higher Apprenticeships* where apprentices work towards work-based learning qualifications consistent with NVQ Level 4 (equivalent to a first degree from a university). This is a relatively recent development.

There are collectively defined training occupations called sectoral «Frameworks» which consist of a number of qualifications and certificates. Apprentices work towards completing a Framework which relates to working in a specific occupation or sector. Typically, a Framework is designed such that apprentices must be able to demonstrate not only occupational competence but also that they have acquired the necessary underpinning knowledge or theory relating to occupational competence if they are to be awarded the Apprenticeship. There are currently around 190 apprenticeship Frameworks spread across many sectors. The specific content of Apprenticeships are decided by the individual Sector Skills Councils (SSC).<sup>2</sup> Large companies can also design their own Apprenticeships so long as they meet the standards required by the State.

Apprentices receive both on-the-job and off-the-job training or instruction. The off-the-job component is often provided by external training providers and may be undertaken on day-release or in blocks of time. The amount of off-the-job training and other details relating to a particular Apprenticeship is set out in a contract agreed between the employer and the apprentice. This contract will typically outline hours of work and training, responsibilities of employers and individuals, rates of pay and other relevant information. Surveys have shown that employers generally pay more than the national minimum wage to their apprentices (Fong & Phelps, 2008). The rate of pay may be increased over the course of the Apprenticeship.

State funding for direct training costs is available to employers who take on an apprentice. Typically this is paid directly to the training provider, such as a further education college, rather than the employer. The evidence from the current study reveals that employers are generally unaware of the costs of training borne by the training

1 Foundation Apprenticeship is now referred to as Apprenticeships but has been retained here to make the distinction between Foundation and Advanced Apprenticeships.

2 The Specification of Apprenticeship Standards for England (SASE) (2009) sets out minimum requirements for Apprenticeship frameworks including vocational and transferable skills, entry requirements, and off-the-job learning time, however SASE was not in effect for the employers covered in this paper as these data were collected in 2007/08. Previous to SASE, the former Learning and Skills Council (LSC) set out guidelines for Apprenticeships in its «Blueprint for Apprenticeships» (2005) which, while not compulsory, are relevant to the sample of employers in the data.

provider with which they engage and typically see the formal training element delivered by the training provider as a free good in many instances.

One of the many issues which the various inquiries into Apprenticeships have considered is the number of participants. Following the major reform of the skills system in England following the Leitch Review (HM Treasury, 2006), there have been further demands to raise the level of participation in Apprenticeships. The evidence to date shows that the inflow into Apprenticeships has picked up substantially over recent years (Table 1). Raising participation levels further will involve drawing into Apprenticeships many businesses which have not previously engaged in this form of training (Hogarth et al., 2009a). Potentially the importance of persuading these employers of the business benefits from engaging in Apprenticeships will become even more pressing.

Table 1: Apprenticeship starts, 2005-2008

	2005/06	20 06/07		2007/08	
	Count	Count	Percentage of change 05/06 to 06/07	Count	Percentage of change 06/07 to 07/08
<b>Apprenticeship (level 2)</b>	<b>122,800</b>	<b>127,400</b>	<b>3.7</b>	<b>151,800</b>	<b>19.1</b>
<b>Advanced Apprenticeship (level 3)</b>	<b>52,100</b>	<b>57,000</b>	<b>9.4</b>	<b>73,000</b>	<b>27.9</b>
<b>All Apprenticeships</b>	<b>175,000</b>	<b>184,400</b>	<b>5.4</b>	<b>224,800</b>	<b>21.9</b>

Source: June 2009 Statistical First Release on Post-16 Education & Skills: Learner participation, outcomes and Level of Highest Qualification held; Table 5

### 3. Previous work on the employer returns to apprenticeship

Demonstrating that employer provided vocational education and training (VET) has an impact on business performance, however measured, is not without difficulty. While there is now substantial evidence which suggests that employer provided training is related to improved organisational performance, many of the econometric studies are methodologically flawed because they fail to control for endogeneity or are beset by measurement problems (e.g. how to measure VET inputs, or improvements in employee performance) (Bosworth, 2005). Many of these studies also tend to ignore the costs of training and concentrate on the gross returns to the employer (Hogarth et al., 2009b). Whatever the employer's rationale for investing in training, the actual decision often tends to be based on belief or intuition that it is the right business decision for the organisation rather than being subject to formal investment appraisal.

In Europe, there have been a number of studies into the costs and benefits of apprenticeship training, particularly for Germany and Switzerland. Both of these coun-

tries operate a dual system of apprenticeship but the net costs of apprenticeship training have been found to differ markedly between the two countries with German firms, on average, incurring significant net costs while net benefits (or negative net costs) have been found for many firms in Switzerland. Mühlemann et al. (2007) find large variations in the net cost of apprenticeship to firms in Switzerland with approximately 60 per cent of firms experiencing net benefits. Comparing the net costs of apprenticeship training in Germany to those in Switzerland, Dionisius et al. (2009) find greater net costs in Germany. On average, they find that the employer experiences a net cost of 7,528€ in Germany, compared with a net benefit of 913€ in Switzerland. For Austria, Lassnigg and Steiner (1997) found average net costs of apprenticeship training for firms to be between 2,921€ and 4,854€<sup>3</sup> with between 29 per cent and 39 per cent of firms estimated to show a net return.<sup>4</sup>

Studies on the net costs of Apprenticeship in England - and the UK more generally - are not as common as European studies. A series of studies in England conducted over the 1990s and early 2000s - the IER Net Costs of Training series - captured information about the net costs to the employer of providing VET under a number of different Apprenticeship Frameworks (Hogarth et al., 1997; Hogarth et al., 1999; Hogarth & Hasluck, 2003). The data collected gave an indication of the extent to which employers had recouped their investments in apprentices by the end of the training period - in general, high cost Apprenticeships were still in deficit but low costs ones had recouped their costs. The latest study in the series extends the cost-benefit model to estimate the future payback period over which employers will recoup all of their investment in training. Based on a series of workplace case studies of employers' investments in Apprenticeships, this paper provides estimates of the level of the employer investment in Apprenticeship training under a number of different Frameworks, as well as identifying the period over which that investment is recouped.

Demonstrating the period over which the employer's cost of providing Apprenticeships might be recouped is important in the UK. The reason why the work-based training route has not established itself to the same extent as in countries such as Germany and Switzerland relates, at least in part, to employers' product market strategies which give rise to a limited demand for the type of skilled workers typically associated with Apprenticeship (Wilson & Hogarth, 2003). In an attempt to break-out of this low-skill equilibrium public policy has been orientated towards persuading employers to raise both their product market strategies and the skills of their workforce. Accordingly, there has been considerable effort expended in trying to assess the returns to employers and individuals where they engage in training programmes such as Apprenticeship in order to raise participation levels (e.g. McIntosh, 2007).

<sup>3</sup> These figures have been calculated by using an exchange rate of 13.7603 ATS : 1€. In the paper, the authors express findings in Austrian Schillings, i.e. 40,200 ATS/66,800 ATS.

<sup>4</sup> The two figures arise from the authors' use of two separate models to estimate the net costs / benefits of training.

#### 4. Data and Methodology

##### 4.1 *The underlying theory*

The training decision facing employers is whether or not to invest in their workforce in the expectation that enhanced skills will lead to higher productivity and greater profit in the future. The decision of whether or not to engage with Apprenticeships will then reflect the employer's perceptions of the costs of training and the longer-term benefits that will accrue to their business.<sup>5</sup> The situation facing employers is represented in Figure 1. In competitive labour markets, under specific conditions, employers will tend to pay workers the value of their marginal product. Training breaks that equality in any specific time period. A wage higher than the marginal product may be paid during a period of training in the expectation that the cost of doing so will be recouped later by paying fully trained employees somewhat less than the value of their marginal product. In Figure 1, the (marginal) productivity of a recruit to an Apprenticeship is represented by the curve MP-MP. This is likely to be low at the outset but increase as the apprentice acquires competence. Towards the end of the training period, the apprentice's productivity is likely to be nearly equal to that of an experienced worker who is fully competent. Over much of the Apprenticeship period the apprentice's wage exceeds the apprentice's marginal product (especially where training is full-time and off the job). The level of the apprentice's wage is likely to reflect the employment alternatives open to young people (such as unskilled work) as well as institutional factors including the National Minimum Wage and the benefit regime.

Once the Apprenticeship is completed, the apprentice will commence work as a fully experienced worker (within the same firm that supplied the individual's Apprenticeship training) at a higher wage, reflecting their increased marginal product. Relaxing the assumption of perfect labour markets<sup>6</sup> which underlies human capital theory distorts the wage structure resulting in the fully trained worker (who has completed the Apprenticeship training) being paid less than their marginal product as their wages are set by the employer at a level that generates a return to the employer on the cost of training the apprentice in the first place (Acemoglu & Pischke, 1999). The divergence of marginal productivity and wages after training may arise due to frictions in the market, such as job search costs. Evidence has been found to support the existence of this productivity premium being obtained by employers (Frazis & Lowenstein, 2005; Bassanini & Brunello, 2008; Booth & Bryan, 2005).

5 Stevens (1994) argues that some employers may be willing to incur training costs associated with apprenticeship in the UK in return for savings on recruitment costs. These savings may be sufficient to justify training investments negating the need to pay ex-apprentices lower wages.

6 Perfect labour markets with credit constraints will result in apprentices receiving wages greater than their marginal product during training but less than their marginal product after training as employers may act as a lender to fund/supply the training provided there is a mechanism (e.g. fixed term contracts) through which they can ensure the repayment of the loan (Booth & Bryan, 2005).

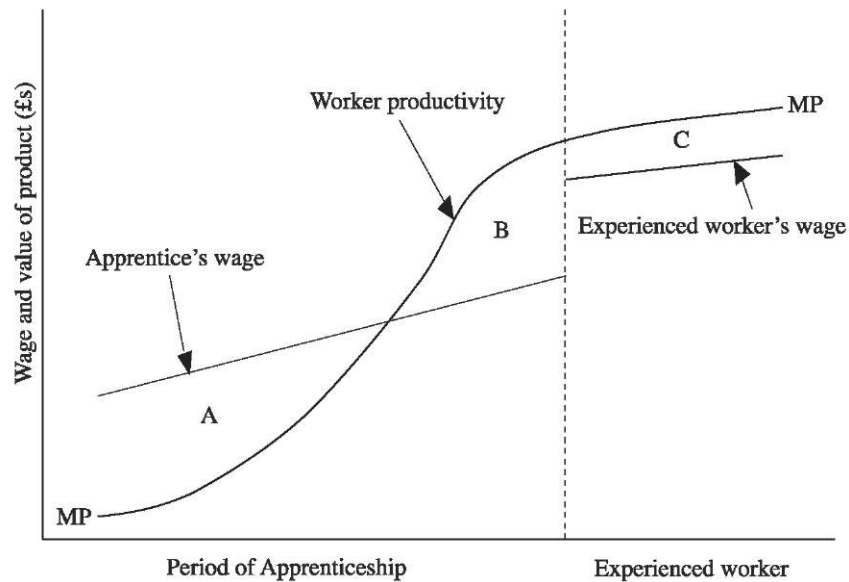


Figure 1: A stylised model of Apprenticeship training

#### 4.2 The Data

Based on the model outlined in Figure 1, evidence has been collected from 42 employers spread across five sectors / Frameworks to show the cost-benefit to the employer from investing in Apprenticeships. The sectors and the number of case studies for each are:

- Engineering (11 case studies)
- Hospitality (8)
- Retailing (8)
- Business Administration (6)
- Construction (8)

These sectors were selected as they provide a contrast between traditional and non-traditional areas of Apprenticeship training. The employers selected within each of these sectors were not selected at random. The sampling frame for the case studies was a combination of:

- the National Employers Skills Survey 2005;
- establishments known to the research team to be participating in Apprenticeship; and
- firms that participated in earlier *Net Costs of Training* studies.



One drawback of the case study methodology is that it does not provide a statistically representative sample of employers and the findings relate only to the selected establishments. Because of this, the case study findings here are indicative rather than providing definitive estimates which can be reliably generalised to the sectors overall. Rather than attempting to draw conclusions for sectors about the net costs of training, the case study findings here are best suited to illustrating the outcomes for particular firms, and in providing details of an approach to analysing potential training investments that may be suitable for other firms to apply in their own contexts.

Data has been collected which permits an estimate of the net costs during the Apprenticeship period. This amounts to estimating the areas A and B in Figure 1 together with the cost of supervision and direct training costs such as course fees. Additionally, the evidence allows an indication to be obtained of the potential returns to employers following the completion of the Apprenticeship. In principle this amounts to identifying the area C in Figure 1 (the employer's return to investment in Apprenticeships).

In each sector where net cost data were collected it refers to the Framework directly related to the sector (e.g. the Frameworks in Construction relate to Level 3 Frameworks in bricklaying and joinery). Data were collected by means of face-to-face interviews with managers. The principal management respondent in the establishment was the person with direct responsibility for the Apprenticeship. In larger establishments this was usually a Training or Human Resources Manager, but in retailing and smaller establishments this tended to be either the General Manager or the owner.

#### 4.3 The accounting framework

The relevant data used for estimating the net current costs of training an apprentice from the start to the end of their programme is outlined in Table 2.

Table 2: Variable descriptions and definitions

Variable name	Definition	Unit of measurement
A	Total number of apprentices	
$w_{app}$	Wage to apprentice	£ per year
$p_{app}$	The employer's estimate of the apprentice's productivity (whilst in the workplace)	Percentage of experienced (fully trained) worker's tasks that apprentice can complete – adjusted for the fact that the apprentice may spend time outside the workplace whilst training over which time period their productive contribution will be zero
$w_{exp}$	Wage to experienced (fully trained) worker	£ per year
$S_i$	Supervision by Training Manager (TM), Line Manager (LM) or Supervisor (SP)	Percentage of i's time used to supervise apprentice

$W_i$	Salary paid to TM, LM or SP	£ per year
$R$	Cost of recruiting the apprentice	£
$C$	Course fees	£
$NIC_i$	National Insurance Contributions per Apprentice (app), Training Manager (TM), Line Manager (LM), Supervisor (SP)	£
$Admin$	Administrative costs	£
$I_{app}$	Income associated with apprentice	£

For each individual year considered, the total cost of training one apprentice ( $TC_{app}$ ) is found as follows:

$$TC_{app} = R + C + w_{app} + NIC_{app} + Admin + \sum_{i=TM,LM,SP} [S_i(W_i + NIC_i)] \quad (1)$$

To calculate the net cost of training one apprentice we need the total benefits derived from training that apprentice ( $TB_{app}$ ):

$$TB_{app} = p_{app} \times w_{exp} + I_{app} \quad (2)$$

Where  $p_{app} \times w_{exp}$  is equal to the value of the apprentice's output. Equation 2 corresponds to the total benefits in a specific year of the Apprenticeship.

The net cost of training an apprentice ( $NC_{app}$ ) in each year of the training is expressed as:

$$NC_{app} = TC_{app} - TB_{app} \quad (3)$$

As the costs and benefits of training an apprentice are encountered over a span of time, the duration of the Apprenticeship to completion, it is necessary to have data as shown in Table 2 for each year of interest. The costs and benefits accruing to the training of an apprentice are calculated for each year of training and then combined over all years of interest using net present value (NPV) methods to obtain the overall net costs of training an apprentice to completion,  $NC_{total}$ .<sup>7</sup>

While the costs of training an apprentice are encountered during the training period (up to completion) the benefits associated with the Apprenticeship extend beyond the training period, typically for as long as the now trained employee works in the training company. One way of assessing the overall net benefits of training then is to

<sup>7</sup> Respondents provided cost information in current terms, i.e. the costs of each year of Apprenticeship training as at the time of the interview.

consider the time taken to pay back the investment, the payback period. To give an indication of the payback period, the following approach has been used. The net present value of an Apprentice ( $NPV_{app}$ ) is calculated by summing the future benefits derived by the business from employing an ex-Apprentice (denoted by  $S$ ) and then, deducting the total net costs of training Apprentices ( $NC_{total}$ ). Since the benefits ( $S$ ) occur in the future they must be discounted by some discount rate ( $r$ ) to a present value:

$$NPV_{app} = \sum_{t=1}^n \left( \frac{S_t}{(1+r)^t} \right) - NC_{total} \quad (4)$$

The employer's benefit from employing an ex-Apprentice,  $S$ , arises here due to the employer paying a wage to the ex-Apprentice that is somewhat less than the newly trained employee's actual marginal product in order to recoup the investment in training as shown in Figure 1.<sup>8</sup> The size of this gap between the new wage and the new marginal product of the ex-Apprentice is difficult to establish in practice. Dearden, Reed and Van Reenen (2000,2005) found that training tended to raise the wage of experienced workers by around half of the increase in productivity brought about by training.<sup>9</sup> If we assume that the increase in wages must be paid out of the total increase in productivity arising from training then we may assume that the total gain arising from training is shared equally, in such a case, between the employer and employee.<sup>10</sup> Accepting this assumption for the establishments covered in the present analysis implies that the total return to Apprenticeships would be equal to twice the difference between the wages of an untrained/unskilled worker and that of a fully trained/skilled worker. The return to the employer, which is the main concern here, would then simply equal the wage of the trained/skilled worker less the wage of the untrained/unskilled worker.

In the absence of data on the wage of an unskilled employee (to compare with the wage of a skilled worker) it is difficult to establish the productivity gain from training in the case study businesses. Data was, however, collected relating to the wages of Apprentices and this may be used as a proxy measure for the unskilled wage - since employers would have to offer something akin to unskilled wages to retain Apprentices - in order to estimate the gap between the unskilled and skilled wage. Alternatively, the productivity gap between Apprentices and experienced workers

8 Acemoglu and Pischke (1999) and many subsequent studies cite wage compression as being necessary for employers to provide general training to their workers, i.e. employers must be able to pay workers less than their marginal product. Labour market imperfections that allow for this in effect turn general skills into de facto specific skills.

9 Dearden et al. (2000,2005) study continuing vocational training (CVT) which may have different rent and cost sharing between employers and employees compared to initial vocational education and training and other forms of training. Nevertheless, theirs is one example in which the productivity gain for employers is quantified as a percentage of the marginal product of the trained employee.

10 If training results in different relative changes in wages and productivity then the total returns to training are shared between employers and employees in different proportions, not necessarily equal. If this is the case then taking the difference between the wages of trained and untrained workers may underestimate or overestimate the actual gain to employers.

may provide a guide to the magnitude of the productivity gains. While neither of these is likely to be a perfect measure, they are remarkably similar. For instance, in the engineering case studies, the average productivity and pay of an Apprentice was estimated as being around 45 per cent and 49 per cent of the productivity and wage (respectively) of an experienced engineering worker. Similarly, Apprentices in the hospitality case studies were estimated to be, on average, 80 per cent as productive as experienced hospitality workers and were paid, on average, 82 per cent of the experienced worker's wage.

In the light of the above it is possible to suggest the possible scale of the employer share of the marginal productivity gain from training Apprentices, expressed as a percentage of the wage of the experienced worker,  $mpg_{emp}$ . Based on the case study responses, the likely scale of the value of the employer's share of the productivity gain in each sector is indicated in Table 3. This indicates that in the Engineering sector, the value of the productivity gain to engineering employers from their investment in apprenticeship training is equal, on average, to 50 per cent of an experienced worker's wage. In the four other sectors the productivity gains were smaller. The lowest value of productivity gain was found for employers in the Retail sector where the gain was equivalent to just 11 per cent of an experienced worker's wage. It must be acknowledged that these are very much indicative figures and based on the particular case studies undertaken, but they serve as a crude basis for a simple assessment of the payback period for Apprenticeship training. The benefits,  $S$ , in each year,  $t$ , in which the ex-Apprentice continues to work for the employer following the training period can be expressed as:

$$S_t = mpg_{emp} * w_{exp}$$

Table 3: Scale of the employer's share of productivity gain, expressed as a percentage of an experienced worker's wage ( $mpg_{emp}$ ) by sector

Sector	$mpg_{emp}$ = Percentage of experienced worker's wage
Engineering	50
Retail	11
Hospitality	20
Business administration	22
Construction	50

In addition to establishing the value of the returns to training, it is also necessary - as in all investment appraisals - to express the stream of future benefits as a present value in order to compare future benefits with present costs on the same monetary

basis. Calculating a present value of a future benefit stream requires the use of a discount rate,  $r$ . The discount rate represents the time preference of the employer: the higher the discount rate the more the employer favours benefit «now» rather than in the future. For the purpose of this exercise a 6 per cent discount rate has been used since this is roughly equal to the interest rate (the market rate of time preference) at the time of the study. No account of employer attitudes to risk is taken since that is likely to vary from one employer to another as well as over time and is largely unknown.<sup>11</sup>

Much of the information required to estimate the NPV was not collected by the case study interviews so that the full value of the investment in Apprenticeships is impossible to establish. The appraisal framework can, however, still be used to assess the investment by asking how long would it take for the employer to have paid back their investment (that is, how many periods of employment must pass for the NPV of benefits to equal or exceed the net cost of training).

Based on the above assumptions, the payback periods for investments in Apprenticeship training have been estimated and are presented in the next section. The purpose of those payback estimates is to illustrate the broad scope for recouping the investment made in Apprenticeship training. The estimates are rough and ready and other assumptions could have been made resulting in slightly different payback periods. The payback periods presented here should, therefore, be considered only as an indicator of the likely return on the investment and not a precise measure.

## **5. Estimates of net costs and payback periods**

Table 4 provides estimates of the net costs (to completion of the apprenticeship) borne by employers in providing successful apprenticeship training; that is the net cost taking into account any apprentices who may have dropped out or failed to satisfactorily complete their Apprenticeship. The data in Table 4 reveal substantial differences by level of Apprenticeship and industry amongst the case study employers, but disguise the fact that within sectors there were also substantial differences between workplaces.

There are variations by industry. Employers in engineering have the highest net costs of training, mainly because training tends to be relatively longer at three and a half to four years, than in construction or business administration. In general, the costs found for the employers in engineering and construction, two industries with a long tradition of apprenticeship training, are higher than for those case study employers in business administration which has no such tradition. It is also apparent that the extent of off-the-job training tends to be relatively high in these sectors whereas there is more learning on-the-job in business administration.

<sup>11</sup> If employers become more risk averse in the light of current financial difficulties then the discount rate they use will increase as will payback period. This will make Apprenticeships a less attractive investment and could deter some employers at the margin.

Table 4: Employers' net costs of training an Apprenticeship to completion (2008 prices in £)

Sector	Level	Cost per apprentice per year of training				Total*
		Year 1	Year 2	Year 3	Year4	
Engineering	Advanced	10,633	8,566	7,034	2,529	28,762
Hospitality	Foundation	4,236				4,236
Retail	Foundation	2,305				2,305
Business Administration	Foundation	1,191				1,191
	Advanced					4,201**
Construction	Advanced	11,340	6,401	4,302		22,043

Notes:

\* Drop-out rates have been factored into the model where employers reported that an apprentice had dropped out a specific stage of the apprenticeship. In general, most drop-out occurred in the early stages of the apprenticeship.

\*\* The costs relating to a Business Administration Apprenticeship are sensitive to the time taken to complete the Apprenticeship. In the case studies this took between two and four years. An overall average is presented in the table. In general, the costs of Apprenticeships in Business Administration revealed a high level of variation relative to the other sectors.

Typically the first 12 to 18 months on an Advanced Apprenticeship results in the apprentice gaining an NVQ Level 2. If the costs borne by employers in the first year of providing an Advanced Apprenticeship to those workplaces providing a Foundation Apprenticeship are compared, then the costs in the former are much higher. This relates to the high off-the-job content of training during the first year of an Advanced Apprenticeship in engineering and construction and consequently low productivity of the apprentice, compared to the situation in industries such as retailing and hospitality where there is much on-the-job learning and relatively high productivity from apprentices.

One has to be careful about suggesting off-the-job learning is better than on-the-job, especially so given the emerging evidence base that informal learning is a highly effective means of delivering skills to individuals (Felstead et al., 2005). But in the context of a structured learning programme such as Apprenticeship it is clear that the level of structured learning over the early period of an Apprenticeship is much greater in those industries with a tradition of this form of training.

As noted earlier, even within the same sector there is variation between workplaces. Table 5 indicates the range of net costs found amongst the case study employers by sector. To further illustrate within-sector variation, Table 6 shows the costs of Apprenticeship training in two engineering workplaces both leading to an Advanced Apprenticeship in Electrical Engineering.<sup>12</sup> For the relatively low cost workplace (on the left) - based on Apprenticeship which takes three and a half years

12 The maximum net cost indicated of Engineering Apprenticeships amongst the case studies is indicated as £39,351 in Table 5 while the relatively high cost example shown in Table 6 has net costs of £34,740. These differ as the case study depicted in Table 6 is not the firm with the highest overall costs but is instead an example of a *relatively* high cost firm.

Table 5: Range of net costs by sector (2008 prices in £)

Sector	Number of case study firms	Maximum net cost	Minimum net cost
Engineering	11	39,351	18,784
Hospitality	8	10,966	1,221
Retail	8	4,917	275
Business Administration*	6	20,883	-7,492
Construction	8	22,640	21,491

Note: \* see notes to Table 4

to complete - the apprentice's wage costs<sup>13</sup> increase over the years of the training from £13,382 a year in the first year to £18,074 in the final year.<sup>14</sup> The employer's estimate of the apprentice's productivity increases from 15 per cent in the first year to 85 per cent in the final year. The employer's wage cost of the experienced worker is multiplied by the productivity estimate to give the apprentice's productivity contribution (row 4) which in this example increases substantially from £4,126 in year one to £11,689 in year four. Summing the productive contribution of the apprentice with other income to the firm attributed to the apprentice (row 7) gives the total benefits of providing the apprenticeship training (row 9). The apprentice's wage costs (row 1), total supervisions costs (row 5) and other costs (row 6) of providing the training (as detailed in equation 1) are summed to give total costs (row 8) which vary across the years of the apprenticeship training. Subtracting total benefits from total costs gives the net costs of apprenticeship training in each year (row 10). The net present value of the net costs during training for the relatively low cost engineering employer being illustrated (row 10, column 6) is equal to £18,784. These data can be compared with a relatively high cost example (right hand side of Table 5) where the net cost is £34,740 per apprentice based on a four year apprenticeship.<sup>15</sup> The net costs detailed in Table 4 were calculated in the same manner but using average figures for each sector and level of apprenticeship.

13 Based on the wage to the apprentice plus the employer's National Insurance Contribution (a form of employment tax) paid by the employer on that wage.

14 In Table 6, the value has been halved to reflect that the apprenticeship was completed half way through this year.

15 If the costs of the low cost apprenticeship taking three and a half years are extrapolated to indicate the costs this employer would have borne if the apprenticeship had been conducted over four years, the net costs would be around £20,000 in the low cost example.

Table 6: Examples of relatively low cost and high cost engineering Apprenticeships (2008 prices in £)

	(1)*	(2)	(3)	(4)	(5)**	(6)	(7)	(8)	(9)	(10)	(11)
		Year 1	Year 2	Year 3	Year 4	Total	Year 1	Year 2	Year 3	Year 4	Total
(1)	$w_{app}$	13,382	15,728	15,728	9,037		9,677	11,509	16,545	18,476	
(2)	$p_{app}$	15%	36%	65%	85%		0%	20%	50%	90%	
(3)	$w_{exp}$	27,504	27,504	27,504	13,752		18,476	18,476	18,476	18,476	
(4) (2) x (3)	Productive Contribution ( $p_{app} * w_{exp}$ )	4,126	9,902	17,878	11,689		0	3,695	9,238	16,628	
(5)	Total Supervision Costs	2,502	1,656	963	197		1,139	3,625	1,942	1,388	
(6)	Other Costs	910	910	910	455		0	0	0	0	
(7)	Other Income	0	0	0	0		0	0	0	0	
<hr/>											
(8) (1) + (5) + (6)	Total Costs	16,794	18,294	17,601	9,689	62,378	10,816	15,134	18,487	19,864	64,301
(9) (4) + (7)	Total Benefits	4,126	9,902	17,878	11,689	43,594	0	3,695	9,238	16,628	29,561
(10) (8) – (9)	Net Costs	12,668	8,392	–277	–2,000	18,784	10,816	11,439	9,249	3,236	34,740

Notes: \* The wage of the apprentice  $w_{app}$  and fully experienced worker  $w_{exp}$  includes the National Insurance Contributions paid by the employer in relation to these wages to give an indication of the wage costs to the employer.

\*\*These costs reflect the fact the Apprenticeship was completed half through the fourth year.



It is clear from Tables 4, 5 and 6 that there are substantial net costs incurred by employers during the period of apprenticeship training. In order to be willing to take on apprentices and to provide their training, employers must be able to recoup these costs over a longer period during which the trained workers are productive. Table 7 presents estimates of the investment payback periods for a range of sectors. The values for each year following completion of the apprenticeship are calculated as the current value of the benefits accrued cumulatively up to the particular year less the current value of the total costs incurred during the training period (see equation 4). Overall, the tables suggest that an employer's investment in Apprenticeships in all the sectors examined is likely to be returned after a relatively short period of time (no more than 3 years in the case of construction and engineering and in the other sectors within one to two years).

Table 7: Net present value (NPV) (£) of investments in Apprenticeship Training by employers and payback period

Sector	NPV of apprenticeship by year in period after apprenticeship training completed (£)					Payback period (years)
	Year 1	Year 2	Year 3	Year 4	Year 5	
<b>Engineering</b>	-17,900	-7,700	2,000	11,100	19,700	2-3
<b>Hospitality</b>	-1,500	1,100	3,500	5,800	8,000	1-2
<b>Retail</b>	-700	900	2,400	3,700	5,000	1-2
<b>Business Administration</b>	-800	2,200	5,000	7,600	10,100	1-2
<b>Construction</b>	-10,400	-500	10,900	20,600	29,900	2-3

In the hospitality and retail sectors the employer's investment in Apprenticeship training (the net cost) was likely to be paid back sometime between the first and second year of post-Apprenticeship employment. This was despite the low margin or small difference between Apprenticeship productivity and that of the experienced worker estimated for these two sectors (just 20 per cent in the case of hospitality and 11 per cent in the case of retailing). This short payback period reflects the low net investment cost in those sectors (despite the low value added of experienced workers). Apprenticeships in business administration also had a relatively short payback period of less than two years. Moreover, where the Apprenticeship was completed in just three, or even two, years the payback period was even shorter because the net costs were lower for such short Apprenticeships. Despite the high net cost of Apprenticeships in engineering and construction, the high value of added productivity

once Apprentices were fully trained meant that the investment was recouped in between two and three years in both sectors.

Whether or not these returns are obtained is obviously dependent upon the extent to which Apprentices stay with the employer that trained them once their training is complete. Employers reported that turnover was lower amongst former Apprentices. Nonetheless in sectors where turnover was high, and retention was low, the payback period would be longer since the net cost of training Apprentices would include «deadweight» spending on training Apprentices who either dropped out of their training or were not retained for long after completion.

Despite the promising findings of relatively short payback periods for the case study firms, such potential for gains over a short period may not be relevant to all firms. This is because non-training firms may incur different costs over different time frames and this is what has led to their non-provision of training in the first place. In the absence of data on firms that do not provide apprenticeship training, it cannot be assumed non-training firms face the same net costs of training than do those that do engage in training. Without looking at the costs and potential benefits for non-training firm alongside those for training firms, the findings cannot be generalised from the case studies to all firms in general.

### **Conclusion**

The benefits of Apprenticeship training to the employer cannot be reduced solely to a cost-benefit calculation purely in monetary terms. Evidence collected in the IER Net Costs of Training to Employers suggests that those employers which participated in the study as case studies recognised a wide range of benefits from engaging in Apprenticeship training:

- employees who trained as apprentices with the company are more steeped in company values;
- former apprentices are often the cadre from which supervisors and managers are recruited;
- former apprentices tend to stay with the company longer (reduced labour turnover);
- apprentices can sometimes be a source of new ideas and innovation.

Employers, especially larger ones and public sector ones, sometimes regarded Apprenticeship training as part of their corporate responsibility to the community in which they were located. It should also be noted that some employer saw little alternative to engaging Apprenticeships. If they wanted to secure a supply of skilled employees, and given a lack of supply in the external labour market, there was no alternative to taking on apprentices.

The types of benefit listed above are related in many respects to the traditional Apprenticeship employer with a relatively long history of taking on apprentices. For

them, there was a strong belief in the value of Apprenticeships to their organisation. As already noted, from a public policy perspective in England there is a desire to increase further the number of apprentices which implicitly assumes that more employers will need to engage with the programme. For these employers there is a need to demonstrate that the Apprenticeship will meet the current and future needs of the company and will be, at the very least, cost free or that they will accrue benefits from the apprentice that at least cover the costs of training in the first place.<sup>16</sup> Some of the sectors in which Apprenticeship starts are likely to grow are in those where the duration of training is relatively short, wage levels of fully experienced workers are relatively low, and labour turnover rates are relatively high (e.g. in those sectors where jobs are in sales and personal service occupations). In these sectors, employers are likely to be concerned about cost especially if they are sceptical about their capacity to retain the services of the apprentices they have trained. Evidence, for example, from Switzerland and Germany, suggests that employers in the former recoup much more of the costs of the Apprenticeship early-on because the labour market is more flexible and there is greater scope for employees to take jobs with other employers (Mühlemann & Wolter, 2007).

In a voluntarist training system such as the system in England, and throughout the UK, allied to a relatively flexible labour market, there is always a concern from employers about the problem of free-riders - those employers which prefer to recruit fully skilled workers who have trained with another employer. Hence there will always be a section - probably a large section - of employers who will engage in Apprenticeships only if they are able to recoup their expenditure before the training is complete or relatively soon thereafter. This is a natural consequence which results from the structure of the labour market in countries such as the UK. Employers will only engage in more costly training which is recouped over a relatively long time period where they are reasonably confident that they can retain the services of their ex-apprentices over the medium-term. The interesting question is whether the quality of training and learning in those sectors which are characterised by Apprenticeship costs being recouped relatively quickly is any lower in countries such as the UK, with its relatively flexible labour market, and others where the capacity of the apprentice to take employment elsewhere immediately upon completion of their training is more constrained? For those commentators who have been critical of Apprenticeship training in the UK this appears to be the crux of the issue (e.g. Ryan et al. 2006; 2007). The research presented here is silent on this issue, but flags it up as a key research question. The evidence, albeit based on a relatively small number of observations, demonstrates that the current system of Apprenticeship training in England would appear to confer financial benefits on the employer.

16 Wolter et al (2006) find that the likely net costs of training are higher for currently non-training firms than for training firms owing largely to the absence of benefits expected for the non-training firm than by higher costs.

## References

- Acemoglu, D. & Pischke, J. S. (1999). Beyond Becker: Training in imperfect labour markets, *The Economic Journal*, Vol. 109, No. 453, pp. F112-F142
- Apprenticeships Task Force (2005). Final Report: *The Business Case for Apprenticeships*. London: TSO, [http://www.employersforapprentices.gov.uk/docs/research/Research\\_1\\_308.pdf](http://www.employersforapprentices.gov.uk/docs/research/Research_1_308.pdf)
- Bassanini, A. & Brunello, G. (2008). Is training more frequent when the wage premium is smaller? Evidence from the European Community Household Panel, *Labour Economics*, Vol. 15, No. 2, pp. 272-290
- Booth, A. & Bryan, M. (2005). Testing some predictions of human capital theory: New training evidence from Britain, *Oxford Economic Papers*, Vol. 56, pp. 88-97
- Bosworth, D. L. (2005). *Determinants of Enterprise Performance*. Manchester: Manchester University Press
- Dearden L.; Reed, H. & Van Reenen, J. (2000). *Who Gains When Workers Train? Training and Corporate Productivity in a Panel of British Industries*. London: Institute of Fiscal Studies, <http://www.ifs.org.uk/wps/wp0004.pdf>, pp. 1-68
- Dearden L.; Reed, H. & Van Reenen, J. (2005). *The Impact of Training on Productivity and Wages: Evidence from British Panel Data*. London: Centre for Economic Performance, Discussion Paper No 674, London School of Economics, <http://cep.lse.ac.uk/pubs/download/dp0674.pdf>
- Dionisius, R.; Mühlemann, S.; Pfeifer, H.; Walden, G.; Wenzelmann, F. & Wolter, S. (2009). Cost and benefit of apprenticeship training: A comparison of Germany and Switzerland, *Applied Economics Quarterly*, 55(1): 7-37
- DIUS (Department for Innovation, University and Skills) (2008). The Government's strategy for the future of Apprenticeships in England. London: DIUS, [http://webarchive.nationalarchives.gov.uk/tna/+http://www.dius.gov.uk/publications/world\\_class\\_apprenticeships.pdf](http://webarchive.nationalarchives.gov.uk/tna/+http://www.dius.gov.uk/publications/world_class_apprenticeships.pdf)
- Felstead, A.; Fuller, A.; Unwin, L.; Ashton, D.; Butler, P.; Lee, T. & Walters, S. (2005). Surveying the scene: Learning Metaphors, Survey Design and the Workplace Context, *Journal of Education and Work*, Vol. 18, No. 4, pp. 359-383
- Fong, B. & Phelps, A. (2008). *Apprenticeship Pay: 2007 Survey of Earnings by Sector*. London: Department for Innovation Universities and Skills, Research Report 08-05
- Fuller, A. & Unwin, L. (2003). Creating a Modern Apprenticeship: a critique of the UK's multi-sector, social inclusion approach, *Journal of Education and Work*, Vol. 16, No. 1, pp. 5-25
- Frazis, H. & Lowenstein, G. (2005). Re-examining the returns to training: functional form, magnitude and interpretation, *The Journal of Human Resources*, XL (2), pp. 453-476
- Hasluck, C.; Hogarth, T.; Baldauf, B. & Briscoe, G. (2008). *The Net Benefit to Employer Investment in Apprenticeship Training*. London: Apprenticeship Ambassadors Network
- Hasluck, C. & Hogarth, T. (1995). *Modern Apprenticeships: Survey of Employers*. London: Department for Employment, HMSO
- HM Treasury (2006). *Leitch Review of Skills. Prosperity for all in the global economy - world class skills, Final Report*. London
- Hogarth, T.; Siora, G.; Briscoe, G. & Hasluck, C. (1997). *The Net Costs of Training to Employers*. London: Department for Employment Research Series, HMSO
- Hogarth, T.; Hasluck, C.; Briscoe, G. & Shackleton, R. (1999). *The Net Costs of Training to Employers to NVQ Level 3*. London: Department for Employment Research Series, HMSO
- Hogarth, T. & Wilson, R. A. (2002). *Skills Matter? A synthesis of evidence from the «Extent Causes and Implications of Skill Deficiencies» Study*. Nottingham: DfES
- Hogarth, T. & Hasluck, C. (2003). *The Net Costs of Training to Employers: Apprenticeships*. Nottingham: Department for Education and Skills Publications
- Hogarth, T.; Hasluck, C. & Daniel, W.W. (2005). *Apprenticeships: The Business Case*. London: Modern Apprenticeship Task Force
- Hogarth, T.; Gambin, L.; Hasluck, C.; de-Hoyos, M. & Owen, D.W. (2009a). *Maximising Apprenticeship Completion Rates*. Coventry: Learning and Skills Council, <http://www.apprenticeships.org.uk/About-Us/~media/Documents/Completions-Research-Final-Report.ashx>
- Hogarth, T.; Bosworth, D.; Gambin, L. & Wilson, R. A. (2009b). *Review of Collective Measures: Empirical Review*. Wath-upon-Deane: UK Commission for Employment and Skills
- Hogarth, T. & Wilson, R. A. (2006). *Skills in England*. Coventry: Learning and Skills Council

- House of Lords (2007). *Apprenticeship: a key route to skills: Volume I - Report*. London: TSO, House of Lords Select Committee on Economic Affairs
- Ipsos MORI (2008). *Research Into Expanding Apprenticeships*. Coventry: Learning and Skills Council
- Lassnigg, L. & Steiner, P. (1997). *Financial aspects of apprenticeship in Austria: Results of an empirical study*. Frankfurt/Main
- McIntosh, S. (2007). *A Cost-Benefit Analysis of Apprenticeships and Other Vocational Qualifications*. Nottingham: Department for Education and Skills, Research Report RR834
- Modern Apprenticeship Advisory Committee (2001). *Modern Apprenticeship: The Way to Work, Report of the Modern Apprenticeship Advisory Committee*. London: Department for Education and Employment
- Mühlemann, S.; Schweri, J.; Winkelmann, R. & Wolter, S. (2007). An empirical analysis of the decision to train apprentices, *Labour*, Vol. 21, No. 3, pp. 419-441
- Mühlemann, S. & Wolter, S. (2007). Regional Effects on Employer Provided Training: Evidence from Apprenticeship Training in Switzerland, *Journal for Labour Market Research*, 2+3: pp. 135-147
- Ryan, P.; Gospel, H. & Lewis, P. (2006). Educational and Contractual Attributes of the Apprenticeship Programmes of Large Employers in Britain, *Journal of Vocational Education and Training*, Vol. 58, No. 3, pp. 359-383
- Ryan, P. Gospel, H. & Lewis, P. (2007). Large Employers and Apprenticeship Training in Britain, *British Journal of Industrial Relations*, Vol. 45, No. 1, pp.127-153
- Stevens, M. (1994). A theoretical model of on-the-job training with imperfect competition, *Oxford Economic Papers*, Vol. 46, No. 4, pp. 537-562
- Wilson, R. A. & Hogarth, T. (2003). *Tackling the Low Skills Equilibrium: A Review of Issues and Some New Evidence*. London: Department of Trade and Industry
- Wolter, S.; Mühlemann, S. & Schweri, J. (2006). Why some firms train apprentices and many others do not, *German Economic Review*, Vol. 7, No. 3, pp. 249-264